

**What is claimed is:**

1. A power driven brake system for a locomotive, comprising
  - (a) a wheel braking device capable of applying direct force to prevent rotation of a locomotive wheel and thereby set a brake;
  - (b) an actuating mechanism for setting and releasing the wheel braking device, the actuating mechanism being capable of operating in a first mode to set the brake and in a second mode to release the brake, said mechanism further comprising:
    - i) a motor,
    - ii) a clutch,
    - iii) a gearing means; and
    - iv) an electronic control system;
  - (c) a linking means, the linking means operably connecting the wheel braking device with the actuating mechanism to facilitate setting and releasing the wheel braking device; and
  - (d) wherein the actuating mechanism is capable of electronically switching between the first mode and the second mode to set and release the brake without manual re-adjustment of the gearing means.
2. The system of claim 1 in which the actuating mechanism is operated by contacting an electronic control panel.
3. The system of claim 1 in which the actuating mechanism is operated remotely by sending signals from a communication device.
4. The system of claim 1 in which the actuating mechanism employs a dual acting solenoid capable of electronically switching between a first mode to set the brake and a second mode to release the brake.

5. The system of claim 1 in which the brake system further comprises:

5 (e) a load sensor connected to the wheel braking device, the load sensor being capable of detecting the amount of force applied to the locomotive wheel and transmitting signals representing the force load level .

6. The system of claim 5 in which the actuating mechanism is capable of setting the brake based on signals indicating that a predetermined load threshold has been reached.

7. A safety brake apparatus, comprising:

(a) a wheel braking device capable of applying force to immobilize a locomotive wheel;

5 (b) an electronically controlled actuating mechanism for setting and releasing the wheel braking device from the wheel, the actuating mechanism being capable of operating in a first mode to lock the brake and in a second mode to release the brake, said actuating mechanism further comprising a motor, a clutch connected to the motor, and a gearing mechanism, further wherein an electronic control system is provided to direct the onset of the first mode or the second mode, the  
10 electronic control system further comprising at least one solenoid that is capable of electronically switching between the first mode and the second mode, thereby facilitating the locking and releasing of the brake in succession without manual re-configuration of the gearing mechanism;  
15 and

(c) a linking means, the linking means operably connecting the wheel braking device with the gearing means to facilitate setting the wheel braking device.

8. The apparatus of claim 7 additionally comprising:

(d) a load sensor, the load sensor being capable of detecting the amount of force being applied and transmitting electrical signals representing the force load level to electronic control system of the actuating mechanism.

5

9. The apparatus of claim 8 further wherein the load sensor is operatively connected to the motor.

10. The apparatus of claim 8 wherein the load sensor is operatively connected to the wheel braking device.

11. The apparatus of claim 7 further comprising:

(d) a communications device capable of sending signals to the electronic control system to facilitate locking or releasing the brake remotely.

12. The apparatus of claim 11 wherein a human operator carries the communications device, the device being capable of transmitting signals to the actuating mechanism to lock or release the brake.

13. The apparatus of claim 7 further wherein the electronic control system is capable of measuring or receiving data representing the degree of load being applied to the locomotive wheel.

14. The apparatus of claim 7 further comprising:

a manual actuating mechanism comprising levers, ratchets and gears wherein movement of a first lever locks the brake, and movement of a second lever releases the brake.

15. The apparatus of claim 14 wherein the manual actuating mechanism and the electronic control system are both capable of locking and releasing the brake.

16. The apparatus of claim 7 in which the electronically controlled actuating mechanism is capable of providing a low or high voltage lockout.

17. The apparatus of claim 7 in which the linking means comprises a chain.

18. The apparatus of claim 14 in which said gearing means comprises a plurality of gears that are capable of reducing the load required to set the brake such that the amount of force needed to set the brake when operating the lever manually is no more than about 75 lbs of force.

19. The apparatus of claim 18 in which the gearing means comprises a three gear configuration.

20. A method of using a safety brake on a locomotive, comprising:

(a) providing a wheel braking device capable of applying force to immobilize a locomotive wheel;

(b) providing an electronically controlled actuating mechanism, said actuating mechanism further comprising a motor, a clutch connected to the motor, and a gearing mechanism, further wherein an electronic control system is provided to engage or disengage the brake, the electronic control system further comprising a solenoid that is

20

capable of electronically switching between a first mode for locking the brake and a second mode for releasing the brake;

(c) providing a linking means operably connected between the actuating mechanism and the wheel braking device;

5 (d) transmitting signals from the electronic control system to the motor;

(e) transferring energy from the motor through the linking means to the wheel braking device; and

10 (f) applying force to set the brake, thereby rendering the locomotive substantially immobile.

<sup>20</sup>  
21. The method of claim ~~21~~ further comprising a load cell feedback control loop that is capable of measuring the load actually being applied at the wheel braking device, such that the value of said load as measured may be used to determine the set point of the brake in the electronic control system.

22. The method of claim 21 further comprising the following step:  
(g) applying force to release the brake without manually adjusting or re-adjusting the gearing means.

<sup>22</sup>  
23. The method of claim ~~23~~ further comprising the following step:  
(h) applying force to set the brake a second time without manually adjusting the gearing means.

24. The method of claim 23 additionally comprising a dual acting solenoid, the solenoid being capable of operating in a first mode to set the brake and in a second mode to release the brake.